# BASEFLOW Simulation Model

## Description of Algorithm

This operation enables the user to compute the baseflow contribution to the outflow hydrograph. Three options are included: constant baseflow, baseflow reduction at a constant rate, and baseflow reduction at a variable rate. Since this operation stores baseflow as a time series, total discharge from a given area can be tabulated into component parts of discharge due to baseflow and discharge due to surface runoff. This operation is primarily designed to be used with API based rainfall/runoff operations. Currently, no provision is included to simulate baseflow recharge.

## Model Parameters

BASEFLOW uses the existing NWSRFS operation definition for defining model parameters. The NWSRFS operation definition is enclosed within a single parameter element named "OPERATION_CONTENTS". An example is shown below. For further information see:
http://www.nws.noaa.gov/oh/hrl/nwsrfs/users_manual/part5/_pdf/533baseflow.pdf

0 ANNM7BF SQIN 6 397.80 15.00 1
0.990
60.14

## Model States

BASEFLOW model states are defined in a property file format. An example is shown below. The model state property names are:

| Property Name | Description |
|---|---|
| PREVIOUS_BASEFLOW | Initial total previous baseflow (CFS or CMS) |
| UNIT | Units for State Variables (always METRIC) |

An example is shown below.

PREVIOUS_BASEFLOW=1.70298438
UNIT=METRIC

## Model Time Series

BASEFLOW requires minimum 0 input time series and maximum 1 input time series and 1 output time series

| Time Series Type | Internal Model | Time Step | Input or Output | Missing Values | Required [Yes or No] |
|---|---|---|---|---|---|

| | **Units** | | | **Allowed** | |
|---|---|---|---|---|---|
| Baseflow | CMS | any | Output | No | Yes |
| Baseflow Recession | PCTD | 24 | Input/Output | Yes | No |

## 1. Notes about configuring Model in FEWS workflow

When the Baseflow model uses an input time series, the property, baseflowModelTimeInterval, must appear in the runInfo.xml file.

For example

```
<properties>
        <string key="legacyLocation" value="Modules/bin"/>
        <int key="printDebugInfo" value="1"/>
        <string key="rootDir" value="Modules/baseflow/town8_stop_restart/"/>
        <string key="outputLocationId" value="town8"/>
        <string key="model"
        value="ohd.hseb.ohdmodels.baseflow.BaseflowModelDriver"/>
        <int key="baseflowModelTimeInterval" value="6"/>
</properties>
```

Examples:
Module Configuration File
ModuleConfigFiles\BASEFLOW_BENM5_BENM5_Forecast.xml
Module Parameter File
ModuleParFiles\BASEFLOW_BENM5_BENM5_UpdateStates.xml

## FEWS Adapter Used

The Baseflow model uses the OHDFewsadapter to communicate. Information about this adapter can be found at OHDFewsadapter.